

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Sub. E1 > also supports the substrate at the thermal exchange position while the substrate is spaced
from the thermal exchange member by between about 0.2 mm and 3.0 mm to enable
conductive heat transport between the thermal exchange member and the substrate.

Please add the following claim:

Sub. E1 > 77. (Newly Added) The cooling mechanism of 65, wherein the cooling
position and the substrate processing position are at substantially similar locations.

REMARKS

In the Final Office Action mailed on June 30, 2002 the Examiner rejected all pending claims. Applicant submitted remarks to overcome the rejections. In the recent Advisory Action mailed on October 16, 2002, the Examiner maintained his rejection of all pending claims.

Applicant respectfully requests continued examination for this Application and full consideration of the amendments and the remarks contained herein.

Amendments to the Claims

Applicant has amended the claims to clarify further the subject matter that Applicant regards as the invention. For example, Applicant has amended independent Claim 53 to recite "a substrate treatment position" and a "heat transport position" with "a means for moving the movable element between a substrate treatment position" and a "heat transport position," the "substrate treated at the substrate treatment position while seated upon the support structure within the chamber" and "the heat exchange member spaced from the substrate by between about 0.2 mm and 3.0 mm" In turn, Claims 57 and 58, depending from Claim 53, have been amended to recite a "substrate treatment position" and a "heat transport position," respectively. Applicant has also amended independent Claim 65 to recite a "a support structure supporting a substrate in a process chamber during high temperature processing at a substrate processing position" and "wherein the substrate processing position, the cooling position and the load position are within the chamber." Additionally, independent Claim 72 has been amended to recite "a drive mechanism capable of moving the support structure between a substrate treatment position and a heat exchange position, wherein the support structure supports the substrate during substrate treatment within the chamber at the substrate treatment position, and wherein the support

structure also supports the substrate at the thermal exchange position while the substrate is spaced from the thermal exchange member by between about 0.2 mm and 3.0 mm.” Support for the amended language can be found in the Detailed Description of the Preferred Embodiment and in the claims as originally filed. (*see, e.g.*, the Application, pp. 5-16 and Claims 53, 65 and 72). Consequently, Applicant respectfully submits that the amendment adds no new matter and is fully supported by the Application as originally filed.

Newly Added Claims

Applicant has added Claim 67. Applicant respectfully submits that the addition adds no new matter and is fully supported by the Application as originally filed. For example, support for the language regarding “the cooling position and the substrate processing position” can be found in the Detailed Description of the Preferred Embodiment. (*see, e.g.*, the Application, pp. 8-10).

Rejections Under 35 U.S.C. § 102

The Examiner has rejected Claims 53-55, 59, 65, 68-69 and 71 under 35 U.S.C. § 102(b) as being anticipated by Bahng (U.S. Patent No. 5,199,483) and Claims 65, 68-69 and 71 as being anticipated by both Hughes and Kroeker. The Examiner has stated that:

“Bahng (Figures 2 and 8) discloses a chamber 16, a substrate support 74, a heat exchange member 36, a movable element 68 and drive mechanism 70 to position the substrate 88 relative to the heat exchange member a gap of 0.254 - 0.762 mm (column 6, lines 38-44). Hughes discloses a chamber 1, a substrate support 11, a heat exchange member (2, 3), an unlabelled movable element and drive mechanism (i.e. dashed lines) to position the substrate 10 relative to the heat exchange member of a gap of at least 1.27 mm (column 4, line 25-28). Kroeker (Figure 7) discloses a chamber 102 having a top wall 103, a substrate support 120, a heat exchange member 142, a movable element 158 and drive mechanism 156 to position the substrate 162, 166 relative to the heat exchange member a gap of at least 0.508 mm (column 7, lines 16-17).”

Applicant respectfully traverses the rejections and submits that the pending claims, as amended herewith, are patentably distinct.

Applicant notes initially that all the Examiner's rejections are based upon the Examiner's blanket refusal to give patentable weight to functional language. Applicant stresses, however, that the Examiner's position is legally untenable. As pointed out in the Request for Reconsideration mailed on September 30, 2002, a "patent applicant is free to recite features of an apparatus either structurally or functionally. *'There is nothing intrinsically wrong with defining something by what it does rather than what it is in drafting claims.'*" See, e.g., *In re Schreiber*, 44 U.S.P.Q.2d 1429, 1432 (Fed. Cir. 1997) (emphasis added; internal citations omitted).

Notwithstanding this rule of interpretation and while Applicant maintains that the Examiner's interpretations of the pending claims, in their previous form, has been in error, Applicant has nevertheless amended the claims to further prosecution of the present Application. Because the pending claims may be better understood against the background of the art of record, Applicant will first briefly discuss the prior art.

Applicant notes that Bahng teaches a "***dedicated*** cool down chamber, thereby increasing the throughput of an associated ***multi-chamber*** semiconductor wafer processing system." Bahng, Column 2, lines 39-43 (emphasis added). Similarly, Hughes teaches a "substrate cooling station" separate from the processing chamber. Hughes at column 4, lines 41-43. Likewise, Kroeker discloses a "wafer cooling system built into the transfer chamber" (Column 2, lines 32-35). Kroeker distinguishes transfer chambers from process chambers by noting that transfer chambers hold the substrate for transport from one processing chamber to another processing chamber. Kroeker, Col. 1, lines 13-30. Thus, the art of record teaches chambers built solely for the purpose of cooling and that are separate from chambers in which substrates are processed.

As such, Applicant notes that the pending claims recite additional structural features not present in the prior art of record. In particular, Applicant submits that the art of record lacks substrate processing structures evident in the pending claims.

For example, Claim 53 now recites "a means for moving the movable element between a substrate treatment position" and "a heat transport position." In addition, Claim 53 recites "the substrate treated at the substrate treatment position while seated upon the support structure within the chamber" and "the heat exchange member spaced from the substrate by between about 0.2 mm and 3.0 mm ... in the heat transport position." Consequently, Claim 53 recites a "chamber" having

two “position[s],” with “the substrate treated” at one position, and “the heat exchange member spaced from the substrate by between about 0.2 mm and 3.0 mm” in the other position and also with “a means for moving the movable element between” the two “position[s].” Applicant notes, however, that the art of record teaches only cooling chambers (Bahng), cooling stations (Hughes), or transfer chambers (Kroeker) having areas within those chambers or stations solely for cooling and, so, having structures that only move, within those chambers, a substrate to a cooling area. In contrast, Claim 53 recites a “means for moving the movable element between a substrate treatment position” and “a heat transport position,” where both “position[s]” are defined as being in the same “chamber.” As such, Applicant submits that the art of record contains no such “means for moving.”

In addition, Claim 53 recites “the substrate being seated upon the support in each of the substrate treatment position and the heat transport position.” As the art of record only discloses cooling areas within various chambers, Applicant submits that the art of record does not disclose any “support structure” seating a “substrate” while the “substrate” is “treated” and also, within the same chamber, seating the “substrate” while having a “heat exchange member spaced from the substrate by between about 0.2 mm and 3.0 mm.”

Likewise, Claim 65 now recites “a support structure” and a “thermal exchange member,” the “support structure supporting a substrate in a process chamber during high temperature processing at a substrate processing position” and the “support structure and thermal exchange member” being “relatively movable between the substrate processing position and a cooling position, in which the substrate is supported upon the support structure between about 0.2 mm and 3 mm from the thermal exchange member, and a substrate load position, in which a wafer handler can place the substrate upon the support structure.” Thus, Claim 65 recites the “support structure” and the “thermal exchange member” being movable between three positions, which are all defined to be “within the process chamber.” Applicant submits that the art of record do not disclose such a “support structure” and “thermal exchange member” “movable” between three such “position[s].” Moreover, as noted above, the art of record discloses various chambers for cooling and, so, at most, the structures within those chambers support a substrate during cooling. Nowhere does the art of record disclose a “support structure” in which the “support structure” is “movable” between “supporting a substrate in a process chamber during high

temperature processing,” supporting a “substrate” at a “cooling position” and also “movable” to a “position” “in which a wafer handler can place the substrate upon the support structure.”

As such, Applicants submits that independent Claims 53 and 65 each recite particular structures not disclosed by the art of record. Accordingly, Applicant submits that the anticipation rejections are overcome and that the pending claims are distinguishable over the art of record.

Rejections Under 35 U.S.C. § 103

The Examiner has rejected Claims 72-76 under 35 U.S.C. § 103(a) as being unpatentable over Ohmine et al. (U.S. Patent No. 5,991,508) in view of Bahng. The Examiner has stated that “Ohmine et al. discloses all claimed limitations except a heat exchange member.” To satisfy this deficiency, the Examiner has stated that “Bahng discloses ... a heat exchange member”. As a motivation to combine these references, the Examiner stated that “[s]ince Ohmine et al and Bahng are both from the same field of endeavor and/or analogous art, the purpose disclosed by Bahng would have been recognized in the pertinent art of Ohmine et al.” and, consequently, “[i]t would have been obvious at the time of the invention was made to a person having ordinary skill in the art to employ in Ohmine et al a heat exchange member for the purpose of actively cooling the substrate as recognized by Bahng.”

Initially, Applicant notes that independent Claim 72 now recites “a drive mechanism capable of moving the support structure between a substrate treatment position and a heat exchange position” with “substrate treatment within the chamber at the substrate treatment position” and that “at the thermal exchange position ... the substrate is spaced from the thermal exchange member by between about 0.2 mm and 3.0 mm” As discussed above, the art of record only discloses cooling chamber and, so, does not disclose “a drive mechanism capable of moving the support structure between” such a “substrate treatment position” and such a “heat exchange position.”

Moreover, as also discussed above, Applicant submits that the art of record does not disclose any “support structure” which “supports the substrate during substrate treatment within the chamber at the substrate treatment position” and “also supports the substrate at the thermal exchange position while the substrate is spaced from the thermal exchange member by between

about 0.2 mm and 3.0 mm” As such, Applicant submits that the obviousness rejections of Claims 72-76 are moot in light of the present amendments to independent Claim 72.

Nevertheless, Applicant addresses the obviousness rejections and submits that Bahng and Ohmine et al. have been improperly combined. In particular, Applicant submits that Bahng’s isolated teaching of “a heat exchange member for the purpose of actively cooling the substrate” does not provide the requisite suggestion to combine Bahng and Ohmine et al. Initially, Applicant notes that “[w]hen references are in the same field as that of the applicant’s invention, knowledge thereof is presumed. However, the test of whether it would have been obvious to select specific teachings and combine them as did the applicant must still be met by identification of some suggestion, teaching, or motivation in the prior art....” *In re Dance*, 48 U.S.P.Q.2d 1635 (Fed. Cir. 1998).

Applicant notes that the “heat exchange member” referenced by the Examiner is the “pedestal assembly 18,” which is a constituent part of Bahng’s “dedicated cool down chamber.” Bahng teaches that the “pedestal assembly 18” has a “large thermal mass” for absorbing heat from a substrate. Bahng, Col. 4, lines 26-36. Applicant submits, however, that merely pointing out that there exists a “pedestal assembly 18” with a cooling function does not address at all the requirement of a suggestion to combine with and modify Ohmine et al. to arrive at Applicant’s claimed invention; the bare description of the “pedestal assembly 18” as used for cooling is not equivalent to a suggestion to use such a part in a heating chamber, such as that disclosed by Ohmine et al. Moreover, the other reference in this combination, Ohmine et al., also contains no discussion of the desirability or feasibility of using the cooling part from Bahng (used in a different chamber) in its described apparatus and, so, also does not provide the requisite motivation to combine.

At most, the Examiner has used Applicant’s claimed invention as a template to identify a particular part of a prior art apparatus with a cooling function similar to that of a part in Applicant’s claimed invention. In light of the lack of a motivation to combine the references, however, Applicant submits that it is impermissible to simply pick and choose among various elements of the prior art in order to form Applicant’s claimed invention. *See In re Gorman*, 18 U.S.P.Q.2d 1885 (Fed. Cir. 1991) (“It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant’s structure as a template and selecting elements from references to fill the gaps.”).

Moreover, Applicant notes that Bahng teaches against a combination with Ohmine et al. In particular, Bahng teaches that “if a wafer is subjected to a high-temperature process in a particular chamber and then must remain within that chamber until the wafer is sufficiently cool to move, the throughput of the system is adversely affected.” On the other hand, a “dedicated cool down chamber” is desirable for “increasing the throughput of an associated multi-chamber semiconductor wafer processing system.” Bahng, Col. 1, lines 56-60. Consequently, Applicant submits that Bahng and Ohmine et al. may not be combined at all because Bahng affirmatively teaches away from heating and cooling in the same chamber. As such, Applicant submits that the obviousness rejection of independent Claim 72 is overcome.

Accordingly, Applicant submits that the pending claims are allowable over the art of record. Applicant has not addressed the further rejections of dependent claims as being moot in view of the amendments and remarks herein. However, Applicant expressly does not acquiesce in the Examiner’s findings not addressed herein. Indeed, Applicant submits that the dependent claims recite further non-obvious features of particular utility.

CONCLUSIONS

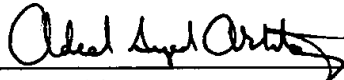
In view of the foregoing amendments and remarks, Applicant requests entry of the amendments and added claims and reconsideration of the rejections. If some issue remains which the Examiner feels may be addressed by Examiner's amendment, the Examiner is cordially invited to call the undersigned for authorization.

Attached hereto is a separate paper entitled VERSION OF THE AMENDMENTS SHOWING CHANGES MADE, in which additions are shown in double underlining and deletions are shown ~~stricken through~~.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LPP

Dated: November 27, 2002

By: 

Adeel S. Akhtar
Registration No. 41,394
Attorney of Record
2040 Main Street
Fourteenth Floor
Irvine, CA 92614
(415) 954-4114

VERSION OF THE AMENDMENTS SHOWING CHANGES MADE

IN THE CLAIMS:

The following claims have been amended:

53. (Twice Amended) A processing reactor for high temperature treatment of substrates, the reactor comprising:

- a plurality of walls defining a chamber;
- a substrate support structure within the chamber;
- a heat exchange member;
- a movable element; and

a ~~drive mechanism~~ means for moving the movable element between a ~~first~~ substrate treatment position within the chamber and a ~~second~~ heat transport position within the chamber, ~~the substrate treated at the substrate treatment first position allowing treatment of the substrate while seated upon the support structure within the chamber, the heat exchange member spaced~~ second position allowing the heat exchange member to be spaced from the substrate by between about 0.2 mm and 3.0 mm to enable conductive heat transport across a gap between the heat exchange member and the substrate in the heat transport second position, the substrate being seated upon the support in each of the substrate treatment first position and the heat transport second position.

~~57.~~ (Amended) The reactor of Claim 56, wherein the heat exchange member comprises a cooling plate and the plate is stored within an actively cooled pocket in the substrate treatment first position.

~~58.~~ (Amended) The reactor of Claim 57, wherein the plate extends over the substrate upon the support structure in the heat transport second position.

65. (Twice Amended) A cooling mechanism in a substrate processing system, the mechanism comprising:

a support structure, ~~the support structure configured to support~~ supporting a substrate in a process chamber during high temperature processing at a substrate processing position; and

an actively cooled thermal exchange member,

wherein the support structure and the thermal exchange member are relatively movable between the substrate processing position and a cooling position ~~within the~~

~~process chamber~~, in which the substrate is supported upon the support structure between about 0.2 mm and 3 mm from the thermal exchange member, and a substrate load position, in which a wafer handler can place the substrate upon the support structure, wherein the substrate processing position, the cooling position and the load position are within the chamber.

72. (Twice Amended) A processing reactor for high temperature treatment of substrates, the reactor comprising:

a plurality of walls defining a chamber;

a movable substrate support structure;

a heat source for heating a substrate upon the support structure within the chamber;

a thermal exchange member; and

a drive mechanism capable of ~~for~~ moving the support structure between a first substrate treatment position within the chamber and a second heat exchange position within the chamber,

wherein the support structure supports the substrate during substrate treatment within the chamber at the substrate treatment first position allowing treatment of the substrate upon the support structure, and wherein the support structure also supports the substrate at the thermal exchange position while the substrate is spaced from the second position allowing the thermal exchange member to be spaced from the substrate by between about 0.2 mm and 3.0 mm to enable conductive heat transport between the thermal exchange member and the substrate.

The following claim has been added:

77. (Newly Added) The cooling mechanism of 65, wherein the cooling position and the substrate processing position are at substantially similar locations.